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Introduction

Libraries are hub of knowledge mines. They are central and integral part of academic life; they are the heart of a university (Balaram, 2001). The primary function of the academic libraries is to serve users for meeting their best academic commitments. They are the channel for academicians to imparting education through means of teaching, learning and research. The education can also fundamentally be developed through optimal utilization of libraries and information services (Magara and Batambuze, 2009). The mode of education becomes liberal, affordable, universal and easy interface through the library system. Users able to search, access, retrieve and disseminate educational resources reside in both local and remote locations.

Academic libraries capture, preserve and disseminate information resources of scholarly interest. They become service-oriented segments mostly managed by their facilities such as LA, NI, CC, ER, MA and NS. Majority of academic libraries are being empowered and enriched today by these facilities. They help the users not only to locate and borrow physically available resources but also help them to browse and search catalogues, access databases, perform real-time interactions, avail electronic document deliver/inter-library loan, etc simultaneously. Therefore, the library facilities are invaluable for meeting the best academic and research needs.

Provision of multiple library facilities can have a strong impact on institutional outcomes. Correlation among the multiple library facilities is even more crucial and important for the libraries to know the strength and

weakness of them respectively. Consequently, the academic libraries can plan and proceed for the further development of the institution as effective and productive as possible. Integration of these library facilities indicates the degree of proximity among them to make out the clear picture of relationship. However, the correlation among them is purely indicative. The idea of correlation was anticipated substantially before 1885 (MacKenzie, 1981). Francis Galton invented correlation, but Karl Pearson was chiefly responsible for its development and promotion as a scientific concept of universal significance (Aldrich, 1995). A strong correlation among the facilities shows the efficiency of the academic library system. It helps faculty, researchers and students in more productive way for excelling institutional progress. It also helps them in writing the lesson plans, grant proposals and research papers for fulfilling their academic achievements. Furthermore, it is helpful for not only to promote academic and scientific progress but also to improve the value and visibility of the institute. Therefore, this study has been conducted with an aim to determine the correlation among the facilities such as LA, NI, CI, ER, MA and NS of various NIT libraries across the country. These facilities are described briefly for this study as follows:

Library Automation (LA)

The LA refers to degree of computerization whether it is fully or partially or in the process. It consists of various integrated library software, installation and management of library software and module functionalities such as acquisitions, cataloging, circulation, serials control, stock-verification and article indexing.

Network Infrastructure (NI)

The NI encompasses of Local Area Network (LAN) whether it is a dedicated or a part of campus network, media used, spread of campus network, Internet connectivity and bandwidth etc.

Computer Infrastructure (CI)

The CI consists of hardware, software and electronic equipments (digital scanners, barcode scanners, printers, video players/recorders and television sets).

Electronic Resources (ER)

The electronic resources refer to information packages made available in digital format. These electronic resources consist of online journals databases (e-journals) searchable datasets (CD-ROM databases) learning resources (CD-ROM, audio/video cassettes), etc.

Manpower (MA)

In considering the manpower, there are two categories, one is professionals who hold Library and Information Science (LISc) degree and their qualifications and second one is non-professionals those who are not having

LISc degree.

Networked Services (NS)

NS are viewed as electronic information services that users' able to access library resources residing both at local and remote site through a network media. Shim et al clearly indicate the definition of NS and their use in the library settings (Shim et al., 2001). In this study, the NS refer to all library transactions that users can do and services they can avail using computer and network technologies. The NS encompass electronic data interchange between publisher/suppliers for acquisition of library materials automated cataloguing for information search and retrieval, automated circulation for check-in, check-out, renewal, reservation, virtual reference for enquiring, electronic current awareness, online databases, Multimedia databases (CD-ROM, audio and video etc.), Electronic Theses and Dissertations (ETD), network communication services (Internet, e-mail, telephone, facsimile, video/teleconferencing and videotext/teletext), e-learning, e-publishing (e-news, blogs) Web-based document delivery, support services etc.

National Institutes of Technology (NITs) - Background

India is a huge country with a population of over one billion. There are traditions in which education and learning are highly valued (Feith, 2008). In fact, the Indian higher education system is growing particularly in the post-independence era. India becomes the largest higher education system in the world in terms of the number of institutions (Agarwal, 2006). India is well known for its large pool of technical manpower (Kaul, 2006). During the second five year plan (1956-60) in India, Regional Engineering Colleges (RECs) were established across the country zone-wise (Table 1) to produce qualitative trained manpower to meet the needs and expectations of the country. Previously, they have been formed to promote regional diversity and multi-cultural understanding and harmony in India. Initially, 17 RECs were set up as joint and cooperative enterprise of the Central and State government on the lines of the prestigious Indian Institutes of Technology (IITs). All these are benchmarking for technical education especially in the areas of engineering, science and technology. Subsequently, these colleges were granted deemed university status with professional management structure. In 2002, the Union Ministry of Human Resource Development, Government of India, decided to upgrade the RECs in phases; all 17 RECs were upgraded as National Institutes of Technology (NITs). On 14th May 2003 all these 17 institutions were taken over as fully funded institutions of the Central Government. Further, three (3) old engineering colleges (Patna, Raipur and Agartala) were established. The NIT Act-2007 has come into force with effect from August 15, 2007. As per the provision of the said Act, these institutions run on non-profitable basis and are declared as "institutions of national importance". Again in 2009, the Government of India has approved for setting up of another 10 new NITs. These new NITs are proposed to be started in the states of and Union Territories of Goa, Puducherry, Delhi, Uttarakhand, Mizoram, Meghalaya, Manipur, Nagaland, Arunachal Pradesh and Sikkim. At present, the total number of NITs is 30. All institutions have their own autonomy to draft curriculum and functioning policies. Greater infrastructure facilities have been provided to these institutions for development of teaching, learning, research and

dissemination of information across the country.

Table 1 NITs by Zone

Sl. No.	*Zone*	*Name of the Library*
1	North	MNNIT Allahabad
2		NIT Hamirpur
3		NIT Jalandhar
4		NIT Kurukshetra
5		NIT Srinagar
6	East	NIT Durgapur
7		NIT Jamshedpur
8		NIT Patna
9		NIT Rourkela
10	North East	NIT Agartala
11		NIT Silchar
12	South	NIT Calicut
13		NIT Surathkal
14		NIT Tiruchirapalli
15		NIT Warangal
16	West	MNIT Jaipur
17		VNIT Nagpur
18		SVNIT Surat
19	Central	MANIT Bhopal
20		NIT Raipur

Research Hypotheses

There is a significant correlation coefficient between the library facilities (LA-NI, LA-CI, LA-ER, LA-MA, LA-NS; NI-CI, NI-ER, NI-MA-NI-NS; CI-ER, CI-MA, CI-NS; ER-MA, ER-NS; MA-NS) of various NITs across the country.

Scope and Limitation of the Study

The present study is confined only to twenty NIT libraries in India concerning their facilities (LA, NI, CC, ER, MA and NS). The survey was limited to the administrators of the concerned libraries. Statistical applications are commonly based on approximations. User interview/opinions and their degree of satisfaction (i.e. user survey) would have added more value to the present study.

Methodology

A methodology adopted for collecting data was questionnaire. A choice of selecting questionnaire method was survey-based. It was designed in structural form and framed into different sections and representing specific facets. A structured questionnaire method remained the primary source for collecting data. Besides, the secondary and tertiary sources were consulted to explore related information. The collection of data obtaining through

questionnaire is presented in Table 2.

Table 2 Data of Facilities among the NIT Libraries

Sl. No.	NIT Libraries	LA	NI	CI	ER	MA	NS
1	MNNIT Allahabad	12	17	12	8	6	11
2	NIT Hamirpur	5	17	11	13	7	10
3	NIT Jalandhar	7	14	7	12	6	12
4	NIT Kurukshetra	10	11	10	11	5	14
5	NIT Srinagar	8	12	10	4	8	11
6	NIT Durgapur	10	12	10	7	8	17
7	NIT Jamshedpur	6	13	7	5	6	13
8	NIT Patna	4	12	6	1	3	3
9	NIT Rourkela	11	16	8	8	6	20
10	NIT Agartala	4	12	3	2	3	2
11	NIT Silchar	9	14	10	12	7	15
12	NIT Calicut	14	15	11	12	10	23
13	NIT Surathkal	14	15	10	7	9	19
14	NIT Tiruchirapalli	11	16	11	15	7	21
15	NIT Warangal	12	16	10	11	10	17
16	MNIT Jaipur	7	12	8	8	5	15
17	VNIT Nagpur	11	12	7	9	7	19
18	SVNIT Surat	12	15	11	13	7	16
19	MANIT Bhopal	6	9	8	10	9	9
20	NIT Raipur	1	15	5	1	5	1

Statistical Method

A statistical procedure is used to analyze and interpret the collection of data. This study attempts to compare and find out the significant correlation between the library facilities of NITs in India. A statistical model applied for this study is a “Pearson Correlation Coefficient”. The test has been conducted using MINITAB R 14 software applications.

Pearson Correlation Coefficient

The emergence of correlation was one of the main developments in statistics during the late 19th century. The Pearson Correlation Coefficient is a statistical application, used to measure the linear relationship between two variables. It shows how strongly the two variables (x and y) are related to one another. It is designated in two ways to measure correlation coefficient. The first one is rho ‘ρ’ (in population), second one ‘r’ (in a sample). Sometimes it is called "Pearson's r. It may variously be thought of as a special type of mean, a special type of variance, the ratio of two means, the ratio of two variances, the slope of a line and may be looked at from several other interesting perspectives (Roders and Nicewander, 1988). Correlation coefficient relationship can also measure in two ways: one is positive and the other one is negative. In a positive relationship, both the variables simultaneously increase (or simultaneously decrease). If it is negative, then one variable increases while the other decreases

reciprocally. The Pearson r = 1 means that there is 100% association between the values of x and y. A Pearson correlation coefficient of +1.00 is called a perfect positive correlation and a coefficient of -1.00 is called a perfect negative correlation (Jaeger, 1990). Generally, the strength of correlation is being measured as follows:

Strong: 0.8; Moderate: r = >0.5 to <0.8 and Weak: 0.5.

Formula for Pearson's Correlation Coefficient

Pearson' correlation coefficient is used to calculate the *similarity* between two samples by using the formula:

Results and Discussion

Correlation among library facilities such as LA, NI, CI, ER, MA and NS, helps to describe a situation or predict the relationship that can be exploited in practice. However, there is also an ounce of uncertainty in the process of empirical analysis. The scale of measurement (strong, moderate and weak) considered for this study is to indicate the strength of relationship among the facilities at significance level <0.05. Lower the significance level is the stronger the evidence (Verfaillie et al, 2008). The software generated output of Table 2 is shown in Table 3.

Table 3 Correlation among Facilities

	LA	NI	CI	ER	MA
LA	1				
NI	0.329	1			
CI	0.710	0.434	1		
ER	0.563	0.325	0.684	1	
MA	0.623	0.188	0.627	0.512	1
NS	0.871	0.274	0.633	0.670	0.637
Strong: 0.8; Moderate: r = > 0.5 to < 0.8 and Weak: 0.5.					

Table 3 shows the significant correlations among facilities of NIT libraries in India. The results indicate that all library facilities have positive correlations and they have been shown Table 4 at the significance level (probability value) <0.05.

Table 4 P-value of Correlation Coefficient between Facilities

Pairs	Correlation	Strong (0.8),	Moderate (> 0.5)	Weak (0.5)	P value
Pair – 1	LA – NI			√	0.156
Pair – 2	LA – CI		√		0.000

Pair – 3	LA – ER		√		0.010
Pair – 4	LA – MA		√		0.003
Pair – 5	LA – NS	√			0.000
Pair – 6	NI – CI			√	0.056
Pair – 7	NI – ER			√	0.162
Pair – 8	NI – MA			√	0.428
Pair – 9	NI – NS			√	0.242
Pair – 10	CI – ER		√		0.001
Pair – 11	CI – MA		√		0.003
Pair – 12	CI – NS		√		0.003
Pair – 13	ER – MA		√		0.021
Pair – 14	ER – NS		√		0.001
Pair – 15	MA – NS		√		0.003
√ indicates the strength of relationship					
Probability value is <0.05					

Table 4 shows the "bi-variate" relationships between twofacilities. Each pair has its own strength of relationship. The outcome of the probable correlation coefficient among the library facilities is shown below:

- The LA has a strong (87%) correlation with NS and moderate correlations with CI (71%), MA (62%) and ER (56%) respectively. It implies that the LA has a close similarity and significant correlation with NS, CI, MA and ER except the NI.
- The NI carries weak relationship with LA (33%), CI (43%), ER (33%) NS (27%) and MA (19%) respectively. Lack of initiation and implementation in operating the network infrastructure facilities at various libraries is causing the weak correlation with others.
- The CI has moderate relationship with ER, NS and MA. The percentage is 68, 63 and 63 orderly.
- Similarly, ER has a moderate relationship with NS (67%), MA (51%).
- Finally, the MA has also moderate relationship with NS (64%).

The findings indicate that excluding NI, all facilities LA, CI, ER, MA and NS are highly and intermediately correlated with each other at the <0.05 of significance level.

Conclusion

Indian higher education system is prosperous by creating and promoting number of academic institutions. Libraries are backbone to educational institutions. They have been funded hugely for building infrastructure facilities which consist of resources, technology (automation), infrastructure (computer and network) manpower and services. Indeed, these are important facilities for an academic library system to serve faculty, students, and researchers to meet the optimal utilization of library resources and facilities largely. From the findings, it has been observed that all library facilities are highly and intermediately correlated with each other except the NI. At the 5% of significance level, the data provide sufficient evidence to conclude that all facilities are positively and linearly correlated with each other excluding the NI. Majority of NIT libraries have

strong automation and services facilities at their end. Further, many NIT libraries have well equipped network infrastructure facilities, but lack of effective implementation and management at various levels are causing the libraries at immature stage of utilization these facilities among NITs. Therefore, the statistical inference of NI was unsatisfactorily correlated with other facilities. However, the NIT libraries are at developmental stage in implementing all facilities including NI. Besides, the academic libraries need supportive tools, techniques and perspectives in order to enrich their facilities to excel academic and scientific progress of the institute. Further studies are needed on user perspective to extract clear understating of using library facilities among the NITs in India.

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